

Application for Patent of

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for

**TITLE OF INVENTION: SHOPPING SYSTEM OF INTEGRATED
ELECTRONIC COMMERCE AND PHYSICAL COMMERCE**

CROSS-REFERENCE OF RELATED APPLICATIONS

This application is entitled to the benefit of Provisional Patent Application Serial No. 60/225,150 filed August 14, 2000.

**STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR
DEVELOPMENT**

Not applicable.

REFERENCE TO A MICROFICHE APPENDIX

Not applicable.

BACKGROUND OF INVENTION

1. Field of the Invention

The present invention relates to a method and system for effecting physical commerce in a computerized environment. More particularly, although not exclusively, the present invention relates generally to a method and system for integrating electronic commerce (e-commerce) and conventional physical commerce in a physically embodied shopping center.

2. Description of the Related Art

Shopping centers, e.g., shopping malls and cities downtown commercial districts, have become prevalent ways and means for selling. Besides retail sales stores, tenants of units in such shopping centers include such diverse operations as restaurants, banks, movie theaters, coin laundries, copy center, public libraries, light manufacturing facilities, local governmental offices, community agencies, data processing offices, and real estate agencies. References to "merchants", "stores", "products", "orders" and "shoppers", etc. herein should be taken to include the comparable terms for all shopping center uses.

Trips to a shopping center to purchase goods can be time consuming and frustrating for shoppers, particularly for those shoppers who do not make regular visits, and who are unfamiliar with the general layout of the shopping center or the layouts within a store in the shopping center. And for a shopper who wants to buy goods, much time may be consumed during hunting for goods among various aisles and shelves in a store or among various stores.

Recent years of development of the Internet and electronic commerce seems to address some parts of the problem by eliminating some of a shopper's trips to physically embodied stores. The Internet and World Wide Web (WWW) have allowed retailers to sell on-line through electronic-commerce systems or on-line virtual stores and malls. More and more traditional brick-and-mortar retailers, e.g., Wal-Mart, have also begun to set up their on-line virtual-store divisions, e.g., WalMart.com. And a shopper can select and purchase products without leaving home or office through on-line shopping. To computer users, on-line shopping may be viewed as a trip to a virtual store that offers many different products and services. For example, Amazon.com and WalMart.com allow users to select and order a wide range of products including books, music and electronics. Another example of on-line retailer is Peapod.com, from whom a shopper can order groceries on-line.

However, to many people, the Internet and World Wide Web still represent a disorganized space. It is a daunting task to navigate the commercial web sites to find satisfactory products. Though in the past several years, graphics and color have been added to text

description of products, it is still hard for a shopper to get an accurate overall feeling of the products, especially when the heavy Internet traffic and limited bandwidth discourage sellers to provide detailed high quality graphic descriptions of products. To many people, as access to Internet is by means of Modem, the communication between the user and the web site is generally slow and discouraging. Thus in many cases, a shopper could not make order decision due to lack of sufficient information on products/services. With the users of the Internet keep growing in a fast pace and high speed access still hardly available or affordable for household individuals, the efficiency of service and communications and the capability to provide sufficient information over the Internet is also a concern for electronic shopping.

Furthermore, even if a shopper decides to order a product on-line, delivery on time has become a burden on both the seller and the shopper. A shopper has to wait substantial long time typically 1-5 days to receive his/her order, depending on various factors such as product availability, on-line vendor, location of a vendor's distribution center and shipping method. Furthermore, faster delivery generally costs more. And if a shopper decides that he or she is not satisfied with a product when receiving it, it can be a hassle as well as a costly process to return the product back to the retailer, which generally involves at least repackaging and mailing the product back to the seller. The recent bankrupt of an once on-line grocery giant Webvan.com is a typical example of current on-line electronic commerce dilemma.

Recently, some physical retailers such as Gap and Best Buy, begin to install web station or kiosk in some of their individual stores. Such kiosks may help a shopper get more information about a store and products offered, they are mere electronic information booth and do not do much to extend the services of the store. Such kiosks do not eliminate the disadvantages of conventional physical commerce. For example the kiosks do not eliminate needs of shoppers to physically hunt for goods among aisles, shelves or among different stores.

BRIEF SUMMARY OF THE INVENTION

The present invention recognizes inconveniences and problems that challenge both con-

ventional physically embodied stores and on-line virtual stores. It is among the primary objects of the present invention to provide a system and method for a shopping facility to attract shoppers and effectively sell by allowing shoppers to receive products/services in efficient, flexible ways.

The present invention provides a novel and improved shopping system that facilitates electronic commerce (e-commerce) and computerized system in a physically embodied shopping facility in which a customer can efficiently purchase products or receive services from among a plurality of stores or service units. The system of the present invention presents to a shopper different methods of receiving products/services from a physical shopping facility.

It is an object of the present invention to provide to a shopper a local electronic-shopping (e-shopping) client system, which is connected through high speed network to an electronic-commerce server system of the shopping facility, such that the shopper will be able to obtain sufficient products/services information of the shopping facility in a fast, real-time fashion. Thus the shopper is able to make better purchase decision and merchants are able to effectively sell.

It is an object of the present invention to provide to a system and method for a shopping facility such that a shopper is able to receive said products/services from a plurality of stores in a real-time fashion without physically visiting the suppliers.

A further object of the present invention is to provide control means for each participating store of a shopping facility such that in-store transactions are reflected in a electronic-commerce server system.

Still a further object of the present invention is to provide such a method and system that allows a shopper to place orders with a shopping facility by using a shopping list, wherein the shopping list is used by an electronic-commerce server system to accordingly present to the shopper a list of items offered at the shopping facility. The shopper may then choose to purchase items from such list.

It is a further object of the present invention to provide a method and system for tracking

a shopper's historical purchased items from a shopping facility.

In accordance with the present invention, a shopping system of integrated electronic commerce and physical commerce comprises: a collection of actual physically embodied stores, in which a shopper can physically visit and receive from among a plurality of products/services; an electronic-commerce server system that maintains information about products/services offered at the stores; electronic means that a shopper can use to purchase goods without physically hunting for goods or physically visiting a store; and a delivery means.

In a particular implementation, the integrated electronic-commerce and physical commerce system of the present invention is a physically embodied shopping center comprising: a collection of physically embodied stores, an electronic-commerce server system, a plurality of local e-shopping (electronic-shopping) client systems, a computer network and a local delivery system. The shopping center of the present invention might further include storage units, e.g., lockers, which are dynamically assigned by the shopping center to shoppers for storing personal items and purchased goods.

In accordance with the present invention, a shopper visiting a shopping center of the present invention is presented with two flexible methods of shopping. In the first method, the shopper can do shopping by directly visiting physically embodied stores in the shopping center and physically look for products or services. In the second method, a shopper can choose to do shopping using a local e-shopping client system, which is generally a computer connected to an electronic-commerce server system. Local e-shopping client systems are preferably set up collectively inside a central building, which we call E-shopping Hall here. In an alternative embodiment, they can also be distributed through various locations in the shopping center such as retailer stores, restaurants, banks, and copy center etc.. When a shopper places an order by using a local e-shopping client system, a delivery can be arranged with the shopping center's local delivery system to have the order delivered to a location designated by the shopper. As the delivery may occur inside a substantially limited range, e.g., inside the shopping center, the shopper may receive the order in a real-time fashion.

It is a further object to provide a method and system for a shopping facility to allow a shopper to receive multiple services in a parallel manner in a real-time fashion.

The present invention may also further comprises means for releasing the burden of a shopper from carrying around stuff in a shopping facility. In accordance with the present invention, an identified storage space unit may be provided by a shopping center of the present invention to a shopper. Purchased items of the shopper may then be delivered by a local deliver system of the shopping center to the identified storage unit. The customer may then pick up at a later time the purchased items from the identified storage unit.

Therefore, from the foregoing, it is a general object of the present invention to provide a novel and improved method and system for a physically embodied shopping facility to effectively carry out commerce while at the same time allowing customers to shop in efficient, flexible and enjoyable ways. The advantages of the system of the present invention become apparent in detailed description hereinafter.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

FIG. 1 is a block diagram of a shopping center in the preferred embodiment that exemplifies the integrated commerce architecture provide by this invention.

FIG. 2 depicts a block diagram of an exemplary Inventory Management Subsystem (IMS) of an electronic-commerce server system.

FIG. 3 depicts a block diagram of an exemplary Customer Management Subsystem (CMS) of an electronic-commerce server system.

FIG. 4 is a flow diagram illustrating an in-store checking out process with a Store Management System (SMS).

FIG. 5 is a flow digram illustrating the process of adding new inventory into a store with a Store Management System (SMS).

FIG. 6 is an illustrative e-shopping front of a shopping center as appeared to a shopper using a local E-shopping Client System (ECS).

FIG. 7A-7B are flow diagrams of example of a shopper using a shopping system of the present invention.

FIG. 8A-8C illustrate placing order using shopping list in one embodiment of the present invention.

FIG. 9 depicts a block diagram of an exemplary Order and Deliver Management Subsystem (ODMS) of an electronic-commerce server system.

FIG. 10 depicts a block diagram illustrating an exemplary Delivery Database of the ODMS depicted in FIG. 9.

FIG. 11 is a schematic diagram illustrating one embodiment of delivery arrangement between stores and order delivery locations designated by shoppers.

FIG. 12 illustrates an exemplary delivery-agent index table that maps a delivery to a delivery agent.

FIG. 13 is a flow diagram that illustrates a routine by which a purchased item is delivered.

FIG. 14 illustrates a process of a shopper returning an order to a store.

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides a method and system that facilitates electronic commerce (e-commerce) in a physically embodied shopping facility, in particular, a shopping center. A shopping system of integrated electronic commerce and physical commerce of generally comprises: at least one actual physically embodied store, in which a customer can physically visit and purchase goods; an electronic-commerce server system; a network; electronic means that a shopper can choose to order products/services without physically hunting for goods or physically visiting a store; means of delivery such that the customer is able to his/her order.

FIG. 1 is a block diagram of a shopping center in the preferred embodiment, generally indicated as 5, that exemplifies the integrated commerce architecture provide by this invention. The system in the preferred embodiment is a shopping center 5 in a computerized

environment. The shopping center **5** includes: a collection of physically embodied stores **10**, preferably established inside a shopping mall **15**; a collection of local E-shopping Client System (ECS) **20**, which are preferably user computers preferably set up in divided spaces or cells inside an E-shopping Hall **25**; a communication network **30**; an Electronic-commerce Server System (ESS) **35**; and a Local Delivery System (LDS) **40**. A physically embodied store **10** preferably further includes a Store Management Systems (SMS) **45** operated by a Store Operator **47**. A physically embodied store **10** through a SMS **45**, local E-shopping Client Systems **20**, ESS **35** and LDS **40** through a communication interface means **50** (preferably comprising mobile electronic communication means) are connected by a communication network **30** and thus may communicate with each other.

A communication network **30** in a shopping system of the present invention are preferably a high speed computer network for the shopping center **5** in forms of local area network (LAN) and/or wide area network (WAN). The communication network **30** may have various implementation embodiments, e.g., wired or wireless or both. High speed communication and data exchange can be achieved utilizing the communication network such as Fast Ethernet, Gigabit Ethernet or wireless Ethernet. The ESS **35** is also preferably connected to the Internet **55**, whereby at least one remote client system **60**, e.g., a home user computer, is connected and able to access the ESS **35**. Then the remote client system **60** may carry out e-shopping (electronic shopping) in a similar fashion as a local ECS **20** does. E-shopping using a local ECS will be described in detail hereinafter in accordance with the present invention. On the other hand, the ECSs **20** may also be connected to a remote network such as the Internet such that a shopper at a local ECS **20** may be able to communicate with a remote user, e.g., a user at a remote client system **60**. A local ECS **20** or a remote client system **60** might also be any electronic device such as a mobile phone that are able to exchange signals with the ESS **35**. A communication network **30** may further includes phone lines systems and wireless communication systems that are deployed for communications. For example, a shopper **8** at a local E-shopping Client System **20** site may use a phone installed at said site

to communicate with a store customer representative to receive customer service.

A local E-shopping Client System (ECS) **20** is preferably a user computer with display and input means, which is connected to the ESS **35** by the communication network **30**. In the preferred embodiment of operation, local ECS **20** are set up in a collective manner inside an E-shopping Hall **25**. An E-shopping Hall **25** is generally a building or part of a building, which is divided into rooms or cells with each cell hosting one or more local ECS **20**. In an alternative embodiment of operation, local ECS **20** sites might be distributed through out various locations in the shopping center such as retailer stores, restaurants, banks, and copy centers etc.. In another alternative embodiment, a local ECS **20** may be a mobile electronic device that is capable of exchanging signal with the ESS **35**. For example, a local ECS **20** may be a hand-held mobile phone or a mobile laptop compute with sufficiently installed software and hardware. A local ECS **20** of the preferred embodiment may further include input means that accepts audio instruction from a user. In an alternative embodiment, the input means of a local ECS **20** might be a touch sensitive screen.

A local ECS **20A** of the preferred embodiment may further include an electronic interface means **62** by which an external electronic device **64** can be connected to the local ECS **20A** to exchange digital signals. In one embodiment of the electronic interface means **62**, it is a wired communication port. In an alternative embodiment, an electronic interface means **62** is a wireless communication interface, such as an infrared or radio frequency (RF) wireless communication interface. In one embodiment of the external electronic device **64**, it is a hand-held PDA (Personal Digital Assistant) such as a Palm PilotTM with sufficiently installed equipment. In an alternative embodiment, an external electronic device **64** is a Smart Card and a corresponding electronic interface means **62** is a Smart Card reader.

The shopping center **5** preferably further includes storage units **68** that may be assigned by the shopping center to customers for storing personal item or purchased items.

In the preferred embodiment, an Electronic-commerce Server System (ESS) **35** includes a server engine **70**, a plurality of Web pages **72**, an Inventory Management Subsystem (IMS)

75, a Customer Management Subsystem (CMS) 80, an Order and Delivery Management Subsystem (ODMS) 85. The ESS 35 might further includes an Advertising Management Subsystem (AMS) 90, which comprises means for controlling and scheduling advertisement contents on Web pages that are requested and displayed on various client systems. The various client systems mentioned here include both local ECSs 20 and remote client systems 60.

A server engine 70 of an ESS 35 includes hardwares and softwares for manipulating digital signal and handling communications over a network or within the ESS 35. For example, it generally include a Web Server, which is able to receive at least HTTP requests by various client systems to access Web pages identified by URLs and provide respective Web pages 72 to the various client systems. The Web pages 72 may be either static computer files or files dynamically generated, for example, by a CGI (Common Gateway Interface) program based on information passed from various subsystems of the ESS 35. A server engine may also include application softwares for mathematical calculation and order and payment handling. A server engine 70 may further include FTP server such that computer files may be downloaded from or uploaded to ESS 35.

An Inventory Management Subsystem (IMS) 75 includes databases that hold information on the inventories and resources of the shopping center including stores, products/services and local ECSs of the shopping center 5. A database is generally a computer file or set of computer files, including, if necessary, supporting software components for the retrieval and storage of data. A database may be implemented using any of a number of commercially available database server systems, such as Oracle and Sybase.

A Customer Management Subsystem (CMS) 80 includes databases that maintain customer related information such as information on customer(s) name, address, payment methods, shopping history and shopping list. In the context above and hereinafter, the term "customer" refers to a shopper who uses the shopping center. The ODMS 85 maintains information on delivered and undelivered purchased items. The LDS 40 arranges deliv-

ery according to information provided by the ODMS **85**, which will be described in detail hereinafter in conjunction with FIGs. **9-10**.

It is appreciated that the boundary of an Electronic-commerce Server System as shown in the drawing by the solid line box indicated by **35** is somewhat arbitrary, in view of the ability to communicate data over networks. The server engine **70**, the Web pages **72** and databases of the subsystems of an ESS **35** can reside in one computer or be distributed among several computers or over computer networks. For example, some parts of an ESS **35** such as store-specific Web pages, store-specific database(s) may reside and managed by each store's individually own computer server system, if implemented distributively.

A LDS **40** generally includes a plurality of delivery agents (not shown), whose major task include delivering orders to shopper(s). A delivery agent's task may further include picking up returned orders from a shopper. When a shopper places an order by using a local ECS **20** in the shopping center, a delivery of the order between corresponding store(s) and a shopper's designated location is arranged with the LDS **40**. A designated location might be the local ECS site at which the customer is placing the order, or a storage unit **68** assigned to the customer. A designated location might further be a location outside the shopping center. Besides being a request for purchasing goods, an order may also be a request for a service from the shopping center **5** such as laundry service, copying service and library book loan and so forth. For example, a customer may request for a copying service from a copier inside the shopping center. In this case, the LDS might send a delivery agent to pick up the copying material from the customer, and send it to the copier for copying service, and after coping service deliver them back to the customer.

A shopper is preferably recommended to have a membership or establish an account with the ESS **35** of the shopping center **5**. With an established membership or account, a shopper **8** may be able to receive expedited service. A shopper **8** can establish an account by using a local ECS **20**, by which the shopper is instructed to interact with the ESS **35**. More specifically, the shopper is instructed to input information such as name and address

and the ESS **35** checks and stores the input information and issues to the shopper a user identification and password for future accessing services provided by the shopping center. The information may further include the shopper's credit card(s) information. A shopper may also establish an account through a store operator **47**. The store operator **47** upon the request of the shopper **8** may input the shopper's information through a SMS **45**.

FIG. **2** depicts a block diagram of an exemplary Inventory Management Subsystem (IMS) **75** of the ESS **35**. An IMS **75** generally includes a variety of databases including a Store Profile Database **105**, an ECS Profile Database **110** and at least one Product Database **115**. In the preferred embodiment of the IMS **75**, each participating store of the shopping center separately owns a respective Product Database **115** for information on products/services offered by the store. A Product Databases **115** might also reside distributively on respective store's server system, if the ESS **35** is implemented distributively.

A Store Profile Database **105** maintains information on participating stores in the shopping center. Information of a particular store generally includes store-specific information such as the name of the store, store category, its location and a logo image of the store. The below shows an exemplary record of a Store Profile Database:

Store ID: 1001

Store Name: XYZ Shoes MegaStore

Store Category: Retailer; Shoes; Clothes

Location: Shopping Center Western Hall, 3rd floor, 3123

Store Logo: (Image)

An ECS Profile Database **110** is used by the shopping center to maintain and monitor the usage log information of local ECSs **20**. The database includes a plurality of records, each associated with a different local ECS **20**. Each record generally includes fields for a local ECS **20** the ECS's identification assigned by the ESS **35**, the IP address assigned by

the ESS, the ECS's system configuration information, the location of the ECS and the log information file name. An exemplary record of an ECS Profile Database **110** is shown as the below:

ID : 123
Assigned IP: 209.120.12.1
system: PC, 700MHz with infrared Port
Location: E-shopping Hall, 2nd floor, Cell 2013
usage log file name: ECS123.log

By using an ECS Profile Database **110**, a shopping center is able to track the usage of each ECS **20**. One unique benefit of using an ECS Profile Database becomes apparent when a shopper **8** places an order through an ECS **20** and requests the order to be delivered to the location where he/she is using the ECS for e-shopping. In such a situation, the ESS **35** automatically detects the IP address of the ECS **20** where the order was placed, and by mapping the IP address to the location information in the ECS Profile Database **110**, the ESS **35** is able to tell the exact location of the shopper without further requesting the shopper to input the location information.

A Product Database **115** of the IMS **75** maintains information on products and services offered at a respective participating store **10** of the shopping center **5**. Information for each product may include product code such as an universal product code (UPC), description, units in stock, stocking location such as aisle and shelf numbers and price of the product. Such information preferably further includes information that links to a digital replica of the product, e.g, a 2D image, virtual 3D reality or an animated presentation of the product. An example of methods to render virtual 3D reality is Virtual Reality Modeling Language (VRML). The below is an exemplary record of a Product Database **115**:

Product Code: 00123456

Product Description: ABC Men's T-Shirt, Medium size

Units in Stock: 12

Location within Store: Shelf 3, Aisle 10

Unit Price: \$19.99

Image file: 00123456.img

In an alternative embodiment of the present invention, a Product Database **115** may be implemented as a part of a SMS **45** of a store instead of the IMS **75** of the ESS **35**. Similarly, store specific Web pages can also be stored in and managed by individual store's SMS **45**. The ESS **35** then assimilates the data collected by the communication network **30** from various stores and presents the data in an understandable format to a shopper at a local ECS **20** or a remote client system **60**.

FIG. 3 depicts a block diagram of an exemplary of Customer Management Subsystem (CMS) **80**. An exemplary CMS **80** includes a Customer Profile Database **120**, a Customer Shopping History Database **125** and a Customer Shopping List Database **130**.

A Customer Profile Database **120** generally maintains customer information for customers. For each customer, the customer information includes customer-specific information such as account identification, name of the customer, billing information and address.

The Customer Shopping History Database **125** generally contains detailed historical information of purchased items of each customer. The database includes a plurality of records, each associated with information of each purchased item. Each record may include fields of the customer ID, purchase date and time, purchased item code, item description, purchase price, applied discount information, retailer and special note. The special note field may be used to indicate a canceled or returned order. Each time a shopper **8** purchases an item from a participating store, either through in-store physical shopping or through electronic shop-

ping using a local ECS **20** or a remote client system **60**, a new record about the transaction may be added to the Customer Shopping History Database **125**. The Customer Shopping History Database's records pertinent to a shopper may be downloaded by the shopper either through a ECS **20** or a remote client system **60**. However, it is preferably that a shopper can not modify the shopping history database. It is also preferably that a shopper may only see his/her own shopping history. One skilled in the art would appreciate that the access restrictions may be controlled by the username and password security scheme.

One unique benefit of the Customer Shopping History Database **125** in conjunction with the shopping system of the present invention is that the shopping history records help a customer track his or her shopping records. The customer may then use the records to plan expense, diets and personal properties accordingly. The shopping history records may also be used as an electronic receipt for proof of purchase, thus release customers burden of book-keeping paper receipts.

A Customer Shopping List Database **130** generally maintains electronic shopping lists for customers who have registered an account with the ESS **35**. A shopper with an account or membership with the shopping center may store at least one shopping list in the Customer Shopping List Database **130**. A shopping list for a customer includes a plurality of records, each associated with an entry for a future potential purchase item of the customer. Each record in the shopping list includes such information as the customer ID, description of the item, quantity wanted and the date when the entry is added to the shopping list and a flag field to indicate if the item has been purchased. An exemplary record of the Customer Shopping List Database **130** is shown in the below:

Customer ID : 0123123

Entry Number: 01

Entry Date: 04/09/00

Entry Description: Man's shoe, size 7, sports

Quantity: 1 pair

Has purchased (flag): No

A shopper **8** may use either a local ECS **20** or a remote client system **60** as depicted in FIG. **1** to record or update the shopping list through their input means. The shopper later can request the ESS **35** to use the shopping list to do automatic search for said list items. When an item on the list is purchased, the ESS may delete the item's record from the Shopping List Database **130** or indicate so in the flag field. Use of a shopping list to do an e-shopping is described in detail hereinafter in conjunction with FIG. **8A-8C**.

Now with reference to FIG. **1**, a shopper **8** entering a shopping center of the present invention has two basic choices of shopping methods. In the first method, the shopper may go directly to a physically embodied store **10**, where he/she can physically select goods and receive services in the store. In the second method, the shopper may use a local ECS **20** to do e-shopping. The second method of shopping using a local ECS **20** is described in detail hereinafter in conjunction with FIG. **6**. A shopper may also do conventional physical shopping using the first method to shop for some products and do e-shopping using the second method to shop for other products. In a preferred embodiment of operation, the ESS **35** of the shopping center updates the store's Product Database **115** of IMS **115** (in FIG. **2**) and Customer Shopping History Database **125** of CMS **80** (in FIG. **3**) in real-time, in regardless of which shopping method the customer uses.

In the first method, a shopper **8** visiting the shopping center **5** goes directly to a store **10**, where he can physically touch and select goods and/or receive services in a conventional

way. After finishing selection, the customer proceeds to a check-out counter (not shown) in the store to pay and check out selected goods. Processing of the order can be carried out in a similar way as in a conventional physical commerce system. For example, the shopper carries his or her shopping cart of goods to a sales person or a store operator **47** at a check-out counter, and the sales person examines the selected goods and gets price information, then the sales person gets total price information and requests the shopper for a payment with a payment method of the customer's choice. The shopper pays the indicated price and gets a receipt. The transaction is then closed.

In accordance with the present invention, an in-store transaction processing is preferably executed through a Store Management System (SMS) **45**, such that an in-store transaction may be executed and communicated with the ESS **35**. Therefore, it is preferred that each participating store **10** in the shopping center installs a SMS **45**. A SMS **45** is generally a computer system associated with it a display, some input devices, storage media such as hard drive and software objects for executing transactions and communication with the ESS **35**. Input devices generally includes a keyboard and mouse which are used by a store operator **47** to input information to the SMS **45**. Input devices may further includes other electronic devices such as bar code scanner or magnetic reader that are used to scan in product information or to read user cards such as membership card or credit card.

FIG. 4 is a schematic flow diagram of in-store checking out process with a SMS **45**, in accordance with a preferred embodiment of the present invention. In step **300**, a shopper **8** proceeds to a check-counter in a store **10** where the shopper has done physical shopping. The shopper is ready to check out selected items from the store, and the SMS **45** starts a new check-out session. In step **305**, under the operation of a store operator **47**, the SMS **45** establishes a communication session with the ESS **35**. The communication is first initiated by a request of establishing communication session from the SMS **45** to the ESS **35**, the ESS **35** then acknowledges the request and the communication session is established.

With referring to FIG. 4, in step **310**, if the shopper has previously established a mem-

bership account with the ESS 35, he/she may have the choice to provide such membership information such that the purchases of the shopper can be recorded in associate with the shopper's account in the Customer Shopping History Database 125 of the CMS 80 depicted in FIG. 3. Under the operation of the store operator 47, the SMS 45 obtains customer membership or account information from the shopper. It is noted that several methods may be used to obtain membership information. In one embodiment of operation, each user account is associated with a membership card, and a membership card is readable by a electronic device such as a bar code scanner connected to the SMS 45. In an alternative embodiment of operation, the store operator may just manually input the membership number or account ID of the customer into the SMS 45.

With referring to FIG. 4, In step 315, the SMS 45 obtain the product code of one single item. Generally the product code is a bar code identifying said item and is readable by an electronic device such as a bar code scanner. In step 320, the SMS 45 transmits the product code to the ESS 35 and requests for price information. In step 325, the SMS 45 obtains price information from the ESS 35, in particular, from the store's Product Database 115 (depicted in FIG. 2). In step 330, the SMS 45 sends signal to the ESS 35 to request the ESS to update the store Product Database 115, in particular, to decrease the product units in stock as recorded in the Product Database by the quantity being checked out. In step 335, if the SMS 45 has obtained the shopper's membership information from the previous step 310, the SMS 45 then sends signal to request the ESS 35 to update the Customer Shopping History Database 125 in the CMS 80, in particular, to add a new historical record on the newly purchased item to the Customer Shopping History Database. Otherwise, the SMS 45 simply continues checking out. In step 340, if the shopper has more items to check out, the SMS 45 loops to step 315, else the SMS 45 continues at step 345. In step 345, the SMS 45 may close the communication session with the ESS 35. In step 350, the SMS 45 calculates the total amount due and obtains payment from the customer. In step 355, the SMS 45 completes the check-out for the shopper and finishes the transaction. Thus

the shopper receives the purchased products or the products are said being delivered to the shopper. In step **360**, the SMS **45** is ready for a new check-out session and loops to step **300**.

In the exemplary schematic diagram in FIG. 4, in particular, in step **330**, the SMS **45** sends a signal to request the ESS **35** to update the Product Database **115**, and in step **335**, the Customer Shopping History Database **125** whenever a new item is being checked out. In an alternative embodiment of operation of the SMS **45**, the SMS **45** may temporarily store all or partial check-out information including purchased items information and customer membership information in local storage media, and at the end of the check-out session or in the middle of the session when information of a plurality of purchased items has been collected, the SMS **45** sends all together the temporarily stored information and signals to request the ESS **35** to update the Store Products Database **115** and the Customer Shopping History Database **125**. Thus reduce the number of back-and-forward communication cycles between the SMS **45** and the ESS **35**.

Besides synchronizing in-store check-out process with the Product Database **115** in the ESS **35**, a SMS **45** may further comprise means for recording new supplies and inventory, such that the process of adding new supplies to a store may also be synchronized with the store's Product Database **115**.

FIG. 5 is a flow diagram illustrating the process of adding new inventory to a store **10** using a SMS **45**. In step **400**, new supplies of products arrive at the store. In step **405**, the SMS starts detailing of one product. The SMS **45** first obtains information of the new supply of the product. The information may include the product's Universal Product Code (UPC), description, units added, location inside the store and price. The product information may be in the form of digital signals provided by the supplier. For example, in one embodiment of operation of obtaining the product information, the information can be stored in a computer floppy disk supplied by the supplier in a format readable by the SMS **45**. In an alternative embodiment of operation, the product information may be manually input into the SMS **45**.

by an authorized store operator **47**. For example, the operator can use a bar code scanner to scan in the product code and then manually input the quantity and price information of the product using a keyboard attached to the SMS **45**. The SMS **45** maintain the information in a format such that the information is convertible to a record of the store Product Database **115** (depicted in FIG. 2). In step **410**, the SMS **45** transmits the product information and signals to request the ESS **35** to update the store Product Database **115**. In step **415**, the ESS **35** updates the store Product Database **115** with the information submitted by the SMS **45**. The update may involve creating a new record for the new product added to the store or simply modifying certain fields, e.g. increasing the number of units in stock of a existing product. The ESS **35** may then send a confirmation back to the SMS **45**. However, the ESS **35** sending back an update confirmation to the SMS **45** may not be necessary. In step **420**, the SMS **45** completes adding new supply of one product. In step **425**, if there are more new supplies of other products, the SMS **45** will loop to step **405**, else the SMS continues at step **430**. In step **430**, the SMS **45** ends adding new supplies of products to the store. It is noted that a store operator may use a SMS **45** to updating inventory information in the similar way as adding new inventory to the store.

SMS **45** may further comprises means that allow a store operator **47** to retrieve customers' and sale information from the ESS **35**. Such information might include a customer's name, address and shopping history. The ESS **35** preferably implements certain business rules to restrict what kind of information is accessible to a specific store. For example, a store operator **47** may be allowed to access only those portion of a customer's shopping history that is related to orders from the store. The SMS **45** may further include means of extensibility such as standardized interface to communicate with other softwares or to add software modules to perform additional functions, for example, doing sales data analysis.

With reference to FIG. 1, though a shopper may use the first method of shopping, i.e., physically visiting stores and selecting goods for purchase as described in the above, for some shoppers, physically hunting goods from one store to another could be tedious and

frustrating. With a shopping system of the present invention, a shopper **8** is also presented with a choice to do e-shopping using a local ECS **20** without physically hunting for goods from store to store in the shopping center.

Using a local ECS **20**, a shopper can retrieve goods and services information about a shopping center **5** through communication with an ESS **35** over local high speed communication network **30**. When the shopper places an order using a local ECS, a request and instruction of delivery is sent by the ESS **35** to a LDS **40**, which arranges a delivery of the ordered goods to a shopper-designated location. A typical shopper-designated location is the site of ECS **20** at which the shopper is doing e-shopping. The LDS **40** may also deliver goods to another desired place, for example, a storage unit **68** assigned to the shopper. The purchased products may further be arranged to be delivered to a location outside the shopping center **5**, for example, to the home address of the shopper. For delivery occurs within the shopping center **5**, which is preferably of limited range, delivery can be made in a substantially short time. The shopper may further be given the choice to decide upon seeing the goods if he or she want to keep the products. If the shopper is not satisfied with any product he or she ordered, the product can be immediately or at a later moment delivered back to the store by a deliver agent (not shown) of the LDS **40**. This real-time shopping without visiting a particular store is of substantial benefits compared to today's WWW on-line shopping, by which it typically takes days for a shopper to receive order products. On the other hand, for shoppers who like visiting stores, the physically embodied individual stores in the shopping center have their own characteristics as a conventional physical store. Using whichever methods of shopping, a shopper is able to receive real-time service. The electronic commerce and physical commerce are thus integrated. The whole shopping center appears as one integrated virtual and real physically embodied super mall to a shopper visiting the shopping center.

FIG. **6** is an illustrative e-shopping (electronic-shopping) front **450** of a shopping center of the present invention as appeared to a shopper using a local ECS **20** for e-shopping. In

a preferred embodiment, an e-shopping front is a Web page. The sample Web page in FIG. 6 was sent from the ESS 35 to a local ECS 20. The e-shopping front 450 is implemented such that a shopper 8 using a local ECS 20 is able to receive multiple services or perform multiple parallel tasks in a real-time manner. In accordance with the present invention, the exemplary electronic shopping front Web page 450 includes a text description field 455, functional section 460 and an advertisement field 465. The contents of the advertisement field 465 are controlled by the Advertisement Management Subsystem (AMS) 90 of the ESS 35. The functional section 460 includes various functional subsections, e.g., buttons, clickable text and images, links, etc., which a shopper may select to perform different tasks or activities. The exemplary functional section here includes a pull-down menu 468 that a shopper can use to browse and select participating stores or service providers and respective available products and services. A shopper may also input search condition in text field 470 to search for a specific store or products. The exemplary functional section further includes subsections such as subsection 475 that instructs a shopper to use or edit a shopping list to shop, subsection 480 that instructs a shopper to order some drink or food, subsection 485 that instructs a shopper to purchase a ticket for a movie on show in the shopping center, subsection 490 that instructs a shopper to watch a movie on the screen, subsection 495 that instructs a shopper to chat or discuss on line with other shoppers, subsection 500 that instructs the shopper to receive on-line customer service, subsection 505 that instructs a shopper to take a virtual tour and find out more information about the shopping center and subsection 510 that instructs a shopper to play music in the background while doing e-shopping. One skilled in the art would appreciate that these various sections and subsections can be omitted or rearranged or adapted in various ways. One skilled in the art would also appreciate that additional sections and subsections may be added depending on available service in the shopping center. The unique integrated implementation of the system of the present invention conveniently allows a user to carry out shopping-related activities while at the same time entertaining oneself or seeking advice and opinions from other customers. The

computerized shopping system in a localized environment makes high speed communication and data transfer very feasible and thus allows complicated data including textual, graphic, audio, video signals and 3D virtual reality to be presented to a shopper. The shopper is thus able to receive sufficient information to make better buying decisions.

With now referring to FIG. 7A-7B, a flow diagram of an example of a shopper using a shopping system of the invention is illustrated. In step **600** in flow diagram of FIG. 7A, a shopper **8** enters the shopping center. In step **605**, the shopper determines which method he or she would like to use to do shopping in the shopping center, e-shopping or physical shopping. If the shopper likes to physically visit stores to buy goods, then the shopper continues at step **610**, else the shopper continues at step **615**. In step **610**, the shopper directly goes to stores in the shopping center to do shopping.

Referring to FIG. 7A, in step **615**, the shopper visits an E-shopping Hall **25** and continues at step **620**. In step **620**, the shopper finds an available local ECS **20** and login to the ECS. In step **625**, the shopper may choose to receive multiple services in a parallel manner as exemplified in parallel steps **625A-625D**. In step **625A**, the shopper begins e-shopping. In step **625B**, the shopper orders a drink from the shopping center by selecting the functional subsection **480** on the electronic front **450** of FIG. 6. Typically within minutes, the ordered drink is delivered to the shopper. In step **625C**, the shopper plays a music by selecting functional subsection **510** on the electronic front **450** of FIG. 6. In step **625D**, the shopper selects functional subsection **495** on electronic front **450** to chat with other shoppers for comments on products and services in the shopping center. While the shopper enjoys drinking in step **625B**, entertaining himself in step **625C** and getting advice from other customers in step **625D**, the shopper continues shopping at step **630**.

Referring to FIG. 7A, in step **630**, if the shopper has a shopping list, then the shopper continues at step **650**, else the shopper continues at steps **635**. In steps **635**, if the the shopper wants to make a shopping list, the shopper continues at step **640**, else the shopper continues at step **672** in FIG. 7B. In step **640**, the shopper makes a shopping list and con-

tinues at step **665**. In a simple embodiment of operation, making a shopping list comprises the step of constructing a list of string that representing items that a shopper desires to buy. In step **650** in the flow diagram of FIG. **7A**, if the shopping list has been previously recorded and stored in the Customer Shopping List Databases **130** of the CMS **80** (depicted in FIG. **3**), then the shopper continues at step **660**, else the shopper continues at step **655**. In one embodiment of operation of shopping list, the shopping list could have been built and recorded in the ESS **35** in a former time using a remote client system **60** by the shopper. In another embodiment of operation of shopping list, the shopping list could also have been built by the ESS **35** according to the shopping history of the customer. In step **655**, the shopper uses a shopping list that he or she has previously recorded in a external electronic device **64** (in FIG. **1**) such as a hand-held PDA (Personal Digital Assistant). Through an electronic interface means **62** connected with the local ECS **20**, the shopper may upload the shopping list from his or her hand-held PDA to the local ECS **20**. Otherwise, in step **660**, the local ECS **20** sends a request to the ESS **35** to retrieve shopping lists that has been previously recorded in the Customer Shopping List Databases **130**. The ESS **35** responds to the request by converting the request to SQL and calling upon the database management system to retrieve the customer shopping list from the Customer Shopping List Databases **130**. The ESS **35** then formats and sends back the requested information to the local ECS **20**. Exemplary process of using electronic shopping list to do shopping is described in detail in conjunction with FIGs. **8A-8C**. In step **665**, after the operation from steps **650** to **660**, the shopping list is retrieved and displayed to the shopper. The shopper is also allowed to modify the shopping list before submitting the shopping list to the ESS **35** to perform automatic search for a lists of products. The shopping list is then ready. The local ECS **20** then sends the final shopping list to the ESS **35**.

Referring to FIG. **7B**, in step **670** in FIG. **7B**, the ESS **35** searches for all stores product databases for goods indicated on the shopping list and continues at step **675**. In step **672**, the shopper does e-shopping by browsing menu **468** or by searching for a single item in

search field **470** on the electronic front **450** of FIG. **6** and continues at step **675**. In step **675**, the ESS **35** retrieves products information from the product databases and formats the information as Web page(s) and send the formatted information to the local ECS **20**. The information includes product-specific information such as products description, price and suppliers. In step **680**, the shopper is instructed to select goods and make purchase. In step **685**, orders from the shopper is received by the ESS **35** and the order is processed and a delivery arrangement is made with the LDS **40**. The order processing may include the ESS **35** calculating total price and sending new Web pages requesting payment methods from the shopper, the ESS verifying payment methods and settling the payment. One skilled in the art would appreciate that existing commercial payment systems and softwares may be used here in payment handling. The description of delivery arrangement is described in detail hereinafter in conjunction with FIGs. **11-14**. In step **690**, one transaction is completed. The shopper may continue shopping.

FIGs. **8A-8C** illustrate placing order for a list of items in one embodiment of the present invention. However, it is appreciated that the process described here may be applied to a more general ordering process. Furthermore, in a broad sense, shopping for a single item may be understood as shopping using a list with one single item.

FIG. **8A** illustrates a display of a Web page on a local ECS **20** describing a shopping list **700** used by a shopper. The shopping list **700** could have been (1) retrieved from the Customer Shopping Lists Database **130** as described in step **660** in FIG. **7A**; or (2) uploaded from the shopper's hand-held device **64** through the electronic interface means **62** of a local ECS **20** as described in step **665** in FIG. **7A**; or (3) just made by the customer in step **640** as described in the flow diagram FIG. **7A**. Field **705** of the shopping list indicates when an entry was added to the shopping list. Item Description field **710** indicates descriptions of each item that shopper intends to purchase. Quantity field **715** indicates the quantity the shopper wants for a particular item. Select field **720** includes an indicator to be used by the shopper to confirm the selection. If the shopper changes his or her mind and does not want

an item any more, the shopper can use the indicator in the Select field **720** to unselect the item. The Web page may further includes a means such as a button to allow the shopper to add additional item at this point. When the shopper selects the “CONTINUE” button **725** in FIG. 8A, the local ECS **20** sends a message to the ESS **35** requesting that the selected items on the shopping list **700** be searched in Products Databases **115** of the participating stores of the shopping center. The ESS **35** then searches the Products Databases, and provides to the ECS **20** new page(s) that shows the search results, which is exemplified in FIG. 8B.

FIG. 8B illustrates the display of an exemplary Web page indicating the search results based on the shopping list in FIG. 8A. Delivery options group **730** shows a list of options which the shopper can select after each item’s search result in **735** to indicate where he or she wants such item to be delivered. In this example, choice “A” indicates a delivery to the local ECS site where the shopper is placing order, choice “B” indicates locker NO. 1423, which was previously assigned by the shopping center to the shopper, choice “C” indicates the home address of the shopper, choice “D” indicates some other address that the shopper may provide, and choice “E” may be used by the shopper to discard the item from the purchase list. The options in the options group **730** are added as exclusive choice in delivery options section **736** after each item’s search result **735**. In this example, the search for “man’s shoes, size 7, sports” in the shopping list **700** yields a list of products that match the description of the item in the shopping list. The information presented to the shopper generally includes product-related information such as image, retailer/supplier, price, detailed description and so on. The search result also includes selection field **737** and text field **738** to allow the shopper to indicate the exact product and quantity the shopper wants. The delivery options section **736** allows a shopper to indicate where a specific item should be delivered. One skilled in the art would appreciate that there are various methods to present the search results **735** and elements within. For example, delivery options section **736** can also be implemented as a pull-down menu. After the shopper finishes making selections or input, the shopper can proceed to confirm the selections by selecting the “CONTINUE” button

740.

FIG. 8C illustrates an exemplary Web page summarizing order selection of the shopper. Summary 750 summarizes the products the shopper selected, their price and where they will be delivered. Different items can be delivered to different places depending on the choice of the shopper in delivery options section 736 for each ordered item. The Web page may further include a section 755 to indicate remaining unpurchased items in the the shopper's original shopping list 700 illustrated in FIG. 8A. Section 755 may further include options to allow a shopper to shop for unpurchased items on the shopper's shopping list. The shopper then confirms the orders and proceeds to pay by selecting button 760. The order information is then send to the ESS 35 for processing. The order processing may include the ESS 35 calculating the total amount due and sending new Web pages requesting payment methods from shopper, the ESS verifying payment methods and settling the payment. One skilled in the art would appreciate that existing commercial payment systems and softwares may be used here in payment handling without modification.

FIG. 9 is a box diagram of an exemplary Order and Delivery Management System (ODMS) 85. An ODMS 85 generally includes a Delivery Database 780 and an Order Archive Database 785. The Delivery Database 780 contains information about purchased items that have not been delivered. The Delivery Database 780 includes a plurality of records, each associated with an undelivered purchased item. Each record includes field for an undelivered item a delivery sequence number, order time, product code (e.g., bar code) of the item, description of the item, retailer store, customer information and delivery instruction. A block diagram of an exemplary Delivery Database 780 is shown in FIG. 10.

Generally after a customer's order information is processed, the ESS 35 passes the information to the Order and Delivery Management Subsystem (ODMS) 85, in particular, adds a new record for each newly purchased item to the Delivery Database 780 of the ODMS 85. After the ESS 35 updates the Delivery Database 780, the ESS 35 may notify the LDS 40 of the change of the Delivery Database. An Order Archive Database 785 contains informa-

tion of delivered purchase. The Order Archive Database **785** may contain all the fields of an delivery database, and additional fields including the delivery status, delivery agent and delivery recipient. When an item is processed for delivery by the LDS **40**, the record for that item is deleted from the Delivery Database **780** and a new record is added to the Order Archive Database **785**.

FIG. 11 is a schematic diagram illustrating one embodiment of delivery arrangement between stores **10** and order delivery locations **800** designated by customers. In general, the delivery agents of the LDS **40** are responsible for deliveries. An order delivery locations **800** may be any of the location options that are among the choices A, B, C, and D in delivery options group **730** in FIG. 8B. That said, order delivery locations may include all locations of local ECSs **20** and storage units **68**. An order livery location may further be a store location. An order delivery location may further be a place outside the shopping center **5**. With referring to FIG. 11, the first delivery agent of the LDS **40**, delivery agent No. 1, delivers ordered items from stores 1-M to desired locations 1-K. A second delivery agent, delivery agent No. 2, delivers ordered items from stores M+1-N to locations 1-K. A third delivery agent, delivery agent No. 3, delivers ordered items from stores 1-M to locations K+1-L, and so forth. It is apparent that for each delivery correspondence between a store and a client location, there is at least one deliver agent responsible for it. A delivery correspondence may be a delivery of purchased item from a store to a shopper. A delivery correspondence may simply be a in-store pick-up by customer, in which the delivery solely occurs within the store. A delivery correspondence may also be a pick-up of a returned merchandise from a shopper and delivery back to a store. A delivery correspondence may further include picking up items from a shopper and sending to a service provider for processing and after processing, delivering said processed items back to the shopper. It is noted not only a delivery may be initiated by an e-shopping order placed at a client system such as a local ECS **20** or a remote client system **60**, but also a shopper doing physical shopping in a store of the shopping center may request a Store Operator **47** in FIG. 1 to initiate a delivery.

FIG. 12 illustrates an exemplary delivery-agent index table that maps a delivery to a delivery agent. A delivery-agent index table **802** includes a plurality of entries. Each entry includes Store field **805**, Location field **810** and Delivery-Agent field **815**. The index table **802** says a delivery between a store as indicated in the Store field **805** and an order delivery location as indicated in the Location field **810** is delivered by a delivery agent as indicated in the Delivery-Agent field **815**. For example, a delivery between the store S_1 and the order delivery location L_1 is the responsibility of the delivery agent D_1 . The descriptions of a store in the Store field **805**, an order delivery location in the Location field **810** and a delivery agent in the Delivery-Agent field **815** can be any unique methods such as identification number or text description, that provides sufficient information to identify entries in the fields. It is noted that an entry in the Location field **810** may represent a group of locations, and a store entry in the Store field **805** can also represent a group of stores.

FIG. 13 is a flow diagram that illustrates a routine used by the ESS **35** by which a delivery is scheduled. In step **900**, if the Delivery Database **780** as illustrated in FIG. **10** is not empty, that is, the Delivery Database contains at least one item that needs to be delivered, then the routine continues at step **905**, else the routine loops at this point and waits for new delivery records to be added to the database. In step **905**, the ESS **35** in particular the server engine **70** reads in one record of the Delivery Database **780**. In step **910**, the ESS **35** retrieves the information of the selling store and the order deliver location from the retrieved delivery record of the Delivery Database **780**. An order delivery location may be a multi-point-location. For example, in a situation that an order is a service request order, in which a delivery correspondence as described in FIG. **11** includes picking up items from a shopper and sending to a service provider for processing and after processing, delivering said processed items back to the shopper. The order delivery location is a multi-point-location includes the service provider location and the shopper location. In step **915**, by looking up the delivery-agent index table **802** with the store and order delivery location information, the ESS **35** determines the delivery agent of the LDS **40** who will carry out

such a delivery. In step **920**, the ESS **35** forward the delivery information to the delivery agent of the LDS **40** through a communication interface means **50** such as a mobile phone or a mobile hand-held computer. The delivery agent then fulfills the delivery task as defined by the delivery record. In step **925**, the ESS **35** deletes said record in the Delivery Database **780**, and adds said record to the Order Archive Database **785**. Then the routine loops back to step **900** for the next record.

FIG. **14** illustrates process of returning an item from a shopper to a store. In step **950**, a shopper requests through a client system preferably a local ECS **20** that he or she wants to return an order. Though a client system here is preferably a local ECS **20**, it may also be a remote client system **60**. In step **955**, the ESS **35** retrieves the shopper's shopping history records from the Customer Shopping History Database **125**, and formats them as Web pages and send to the ECS **20**. The local ECS **20** then displays said order history information to the shopper. In step **960**, the shopper indicates which order to return among the shopping history records. In step **965**, the ESS **35** collects the return-order information and the pick-up location from the shopper. In step **970**, the ESS **35** then formats the information to a delivery record and add the new record to the Delivery Database **780**. The delivery of a return order from the shopper is then treated as a normal delivery described in FIG. **13**. In step **975**, a deliver agent of the LDS **40** comes to pick up the item and delivers it back to its respective supplier. Credit or refund may then be handled by the supplier upon receiving the returned item. In step **980**, the ESS **35** updates the Customer Shopping History Database **125** and Order Archive Database **785** by marking the order as a canceled or returned order. In step **985**, a return order is completed. In an alternative embodiment of the operation of a return order, the operation can starts by the ESS **35** directly collecting order information and pick-up location information from the shopper without looking up in the Customer Shopping History Database **125**, and then continue at step **970**. Apparently, the shopper may return the order by directly visiting the supplier.

It is noted that the herein described process of shopping using a local ECS **20** may be

readily applied to a remote client system **60** without modification.

The many features and advantages of the present invention are apparent from the detailed specification, and primarily, it provides a novel shopping system of integrated electronic commerce and physical commerce. It is to be understood that the present invention is not limited to the embodiments illustrated and described herein, and variations and modifications may be readily occur to those skilled in the art without departing from the scope of the present invention.